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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	WALCZAK ET AL.)	
)	Examiner D. Le
Appl. No.	09/769,122)	
)	Art Unit 2685
Confirm. No.	5562)	
)	Atty. Docket No. CS10560
Filed:	24 January 2001)	
Title:	"Method And System For Validating A Mobile Station		
Location Fix"			

DECLARATION UNDER 37 C.F.R. § 1.131

Commissioner for Patents
Alexandria, Virginia 22313-1450

Sir:

The following Declaration and any attachments are to establish conception in the United States of claimed subject matter in the referenced patent application and diligence to the filing of the referenced patent application on 24 January 2001 from a date prior to the effective date of the following references relied upon by the Examiner to support rejections under 35 U.S.C. 102(e) and 35 U.S.C. 103(a) in the Office Action dated 10 November 2003:

United States Publication No. 2002/00198001 A1 (Bajikar) filed in the United States on 27 December 2000; and

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WALCZAK ET AL.
"Method And System for Validating A
Mobile Station Location Fix"
Atty. Docket No. CS10560

Appl. No. 09/769,122
Confirm. No. 5562
Examiner D. Le
Art Unit 2685

United States Publication No. 2002/0164993 A1 (Elliot) filed in the
United States on 12 December 2000.

In support of this declaration, We, Thomas J. WALCZAK of
Woodstock, Illinois, and William P. ALBERTH of Crystal Lake, Illinois, declare
and sayeth the following:

That we conceived the claimed subject matter of the referenced
patent application in the United States before the 12 December 2000, which is
prior to the effective dates of United States Publication No. 2002/00198001 A1
(Bajikar) and United States Publication No. 2002/0164993 A1 (Elliot) in the
course of employment by Motorola Inc., the assignee of the instant application
by virtue of an assignment duly recorded on the Official record of the United
States Patent & Trademark Office, REEL/FRAME 0111509/0088;

That the claimed subject matter of the referenced patent
application was the subject of a written invention disclosure prepared after
conception, and that before 12 December 2000 the invention disclosure was
submitted to a Patent Committee of Motorola Inc., the assignee of record for
consideration and assignment to a patent attorney for preparation and filing of
a patent application;

That each of the dates redacted from the disclosure attached as
Appendix I is prior to 12 December 2000;

That on information and belief a patent application was prepared
and filed, in due course upon, in the United States Patent Office on 24 January
2001 by or on behalf of Motorola Inc.;

That all statements made herein of our own knowledge are true
and that all statements made on information and belief are believed to be true;

WALCZAK ET AL.
"Method And System for Validating A
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Art Unit 2685

and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Thomas J. Walczak 2/9/04

Thomas J. WALCZAK

Date

William P. Albert 2/10/04

William P. ALBERTH

Date

MOTOROLA INC.
Personal Commu. ons SectorSecurity Classification
Motorola Confidential Proprietary (when completed)

Inventor(s) will not fill in

Operation

A700 (Linder)

DISCLOSURE NO.

CS-10560

DATE

Patent Committee Action

Pursue

Inventor(s) Name(s)

Walczak, Albert

DISCLOSURE FOR PATENT COMMITTEE

SUBMITTED PURSUANT TO EMPLOYMENT AGREEMENT

FOR INSTRUCTIONS FOR COMPLETION REFER TO DISCLOSURE INSTRUCTION PROCEDURE

Inventor must fill in items 1 thru 12.

Items 2 to 5 may require extra sheets. BE SURE they are signed, witnessed and attached.

1. Name of the invention. (Limit to ten words.)
History based location assistance
2. State the problem(s) resolved by the invention.
See attached.
3. Describe the invention in detail. Include its operation, purpose, environment and how problem(s) were solved. (Use separate sheets as required.)
See attached.
4. What new elements (e.g. components, circuits, process steps) or combinations of known elements or software algorithm produced the improvement(s) over known technology?
See attached
5. List the closest known technology (attach article, patent, catalog sheet or other documentation).
See attached.
6. What are the potential applications for use of this invention?
Any wireless device.
7. Conception date? [REDACTED] (Attach earliest log sheets, drawings, etc., to support dates).
8. To whom did you first disclose this invention? Name: [REDACTED] Advanced Inventing Sessi
9. Date the device was first built and tested. [REDACTED]
Present location of the device? [REDACTED] Not built.

DETERMINATION OF LEGAL INVENTORSHIP FOR PATENT APPLICATION MUST BE MADE BY THE PATENT DEPARTMENT.

Inventor's signature (IMPORTANT - YOU MUST USE YOUR FULL FIRST, MIDDLE AND LAST NAMES)						
10. Inventor's Full Name: (Type)						
Thomas J. Walczak		Signature		Date		Social Sec. No.
Home Address: Street		City		State		Country
3070 Boarderly Way		Woodstock		IL		USA
Citizen of (i.e. U.S., Germany, Etc.)		Dept. No.		Room No.		Employee Status
USA		BA503		AS211		X Permanent Contractor
Phone		3-2293				
11. Inventor's Full Name: (Type)						
William P. Alberth Jr.		Signature		Date		Social Sec. No.
Home Address: Street		City		State		Country
1471 Woodscreek Cir		Crystal Lake		IL		USA
Citizen of (i.e. U.S., Germany, Etc.)		Dept. No.		Room No.		Employee Status
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Phone		3-2551				

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Security Classification: Motorola Confidential Proprietary (when completed)

12. Inventor's Full Name: (Type) _____ Signature _____ Date _____ Social Sec. No. _____

Home Address: Street _____ City _____ State _____ Country _____ Zip Code _____

Citizen of (i.e. U.S., Germany, Etc.) _____ Dept. No. _____ Phone _____ Room No. _____ Employee Status _____

Permanent _____ Contractor _____

Witness signatures (TWO WITNESSES ARE REQUIRED)

Witness must sign and date this form and all attachments.

THE WITNESSES IN SIGNING THIS FORM ATTEST TO THE FACT THAT THEY UNDERSTAND THE INVENTION.

13. Witness Name (Type) David Haub Signature David Haub Date [redacted] Phone 847-523-2254

14. Witness Name (Type) Inke Winkelmann Signature Inke Winkelmann Date [redacted] Phone 47-523-2491

Items 15 to 25 are to be filled in by the ENGINEERING and MARKETING/PRODUCT MANAGER or equivalent. Use separate sheets as required.

THE MANAGERS IN SIGNING THIS FORM ATTEST THAT THEY UNDERSTAND THE INVENTION

15. What product will this invention be used in? (No code names - use brief description if necessary)
No Plans at this time

16. When (was) (will) the first offer for sale of a product incorporating this invention (be) made?
Date: 2nd Half 00

17. When is the estimated shipping date? 4th Quarter '00

18. When (was) (will) the first disclosure outside of Motorola (be) made? How and to whom? Nondisclosure agreement signed? State title and date of publication, if any.
2nd Half 00

19. What is the market for products incorporating this invention?
This invention may be applied to any cellular telephone technology since they all rely on handoffs and must know the approximate location of the mobile.

20. Who are the potential competitors? What is the possibility this invention will be used by competitors? Which ones?
Potential competitors are Sony, Samsung, Qualcomm, Nokia, etc.

21. Did this invention result from work on a development contract: (YES) (NO) Contract No. _____
Who was the contracting party?
No

22. Discuss the business impact that this invention will have on Motorola. Be specific and quantitative.
Provides potential future differentiating feature or enhancement. May impact future standards.

23. Engineering Manager's Name (Type) Don Linder Signature Don Linder Date [redacted] Dept. No. QA-960 Phone 3-8690

24. Product/Marketing Manager's Name (Type) _____ Signature _____ Date _____ Dept. No. _____ Phone _____

25. The Manager must determine the security classification of this information. See Personnel Policy #840, and Corporate SOP E60, Protection of Proprietary Information.

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2. Problem resolved with the invention

GPS will be widely used for locating cell phones in the future. However, GPS is not 100% accurate and can give erroneous results. Errors are mainly due to operation in blocked environments and urban canyon environments. In these environments either a limited number of satellites are available to make a position fix from or multi-path causes errors in the position solution. Due to the importance of locating users in emergency situations, it is desirable to augment GPS to build confidence in the location fix.

3. Describe the invention in detail, include its operation, purpose, environment and how problem(s) were solved.

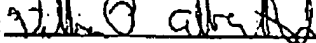
Solution #1:

Cell phones routinely sample neighboring cells to report signal strengths to the base station. This information is used today for managing hand-offs between cells. We would store away this information with time stamps either locally in the handsets or in the base station.

When the user initiates an E911 call, the base station down loads the neighbor cell history (or recalls the information from memory). Base station can compare the readings and history against a database and determine if the GPS location makes sense.

1. Figure 1 shows a map of a cellular system with cell sites A through H.
2. User X moves through the cell sites going about his business.
 - 2a. As the user moves the base stations up date his neighbor list and the phone routinely makes signal strength measurements of the neighboring cells.
 - 2b. The phone stores a history of the neighbor list and measured signal strengths as described in Figure 2. Alternately, the history can be stored in the base station.
3. User initiates an E911 call, determines a GPS position and sends fix to the base station. Cell phone also downloads neighbor list history to base station.
4. Base station plots history of neighbor list against data base of measured signal strength vs location. Plotted positions will have significant error bars (if they didn't we wouldn't need GPS).
 - 4a. For this example we presume that the user's cell phone had 5 history points in memory. The possible locations and error bars of the six points are plotted in Figure 3 as well as the reported GPS fix.
5. For this example, the reported GPS fix (Figure 3) does not correspond to the history estimates. The history points indicate that the cell phone is probably somewhere between Cell sites C, D, and E, while the GPS fix shows the cell phone in cell H. For this example it is easy to determine that the GPS fix is questionable.
6. At this point the base station can order the cell phone to take another GPS fix. If the present GPS fix is reported to the E911 operator it can be tagged as questionable data. This would tip the operator that he/she should concentrate on trying to ask the user exactly where they are.
7. This process is further outlined in Figure 4.

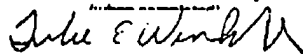
Inventor(s) Signature(s)/Date(s):



Witness Signatures/Dates:



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(when completed)Solution #2:

The technique of using past history to validate the present position may also be extended to storing and time stamping previous GPS fixes. This will work in much the same way as the previous example except that the use of neighbor lists is replaced by GPS fixes.

The analysis of past location information can be used to determine the accuracy of the present location fix. There are several examples of how this works 1) in tracking applications if there is a plotted point with significant deviation from the path of the average locations this data may be assumed to be erroneous 2) if the distance between the recent past location estimates and the present location fix would require the person to move at a velocity greater than is considered practical the fix can also be considered erroneous.

4. What new elements (e.g. components, circuits, process steps) or combination of known elements or software algorithm produced the improvement(s) over known technology?

We would write claims to cover:

- Storing in the cell phone time stamped histories of neighbor cell measurements and previous GPS fixes.
- Storing in the base station (or switch) time stamped histories of users neighbor list and previous GPS fixes.
- Using the history information to develop confidence in the GPS fix.

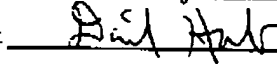
5. Prior Art

Triangulating off neighbor cell measurements is a known method to determine location. But using a history of measurements to assist in location is not known.

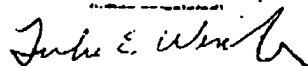
Inventor(s) Signature(s)/Date(s):

 [Redacted] [Redacted]

Witness Signatures/Dates:

 [Redacted]

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 [Redacted]

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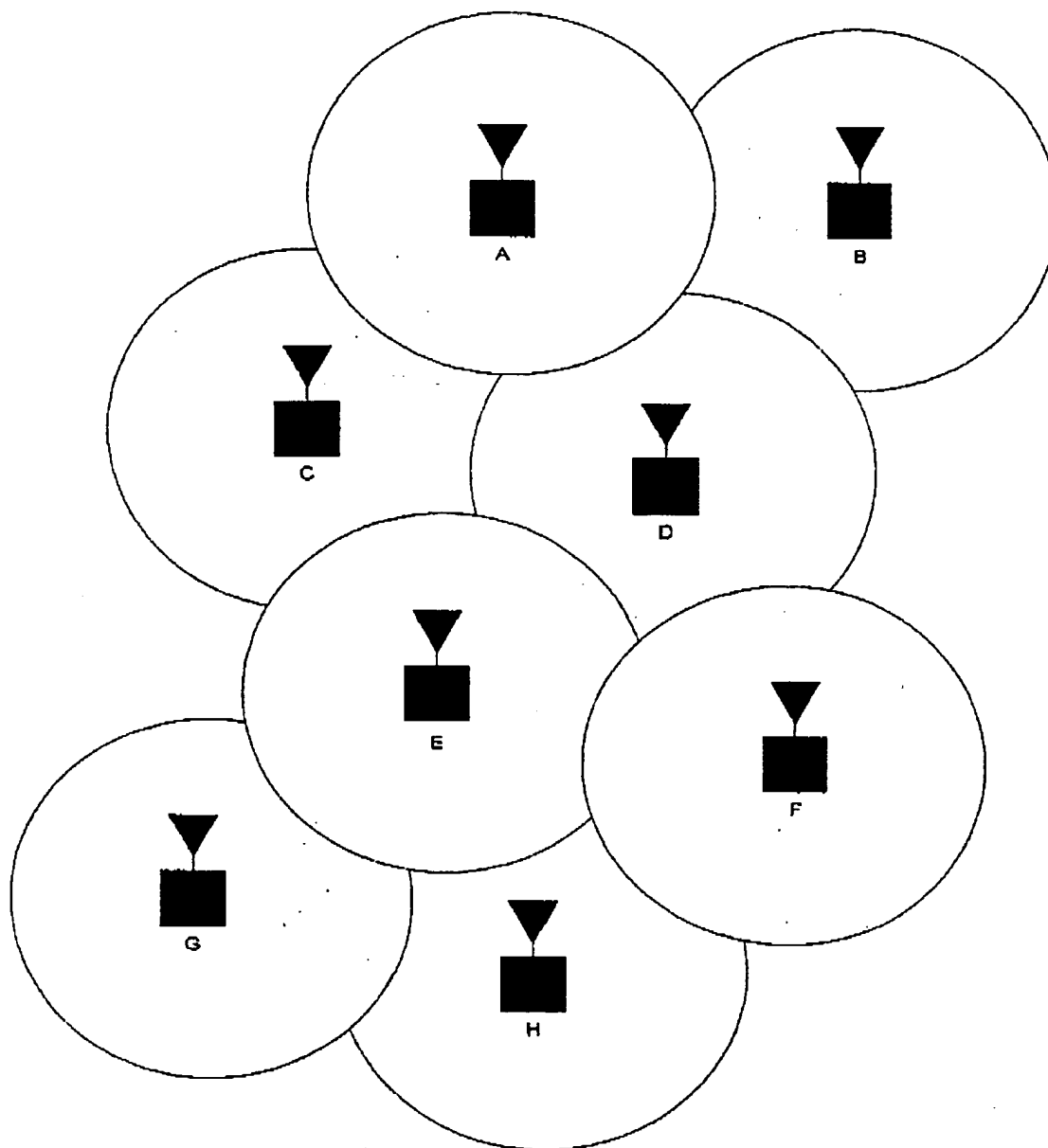
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Figure 1. Cell Site Map

Inventor(s) Signature(s)/Date(s):

William P. Caldwell

Witness Signatures/Dates:

Joey Walsh
Dail Hulse

Motorola Confidential Prop:

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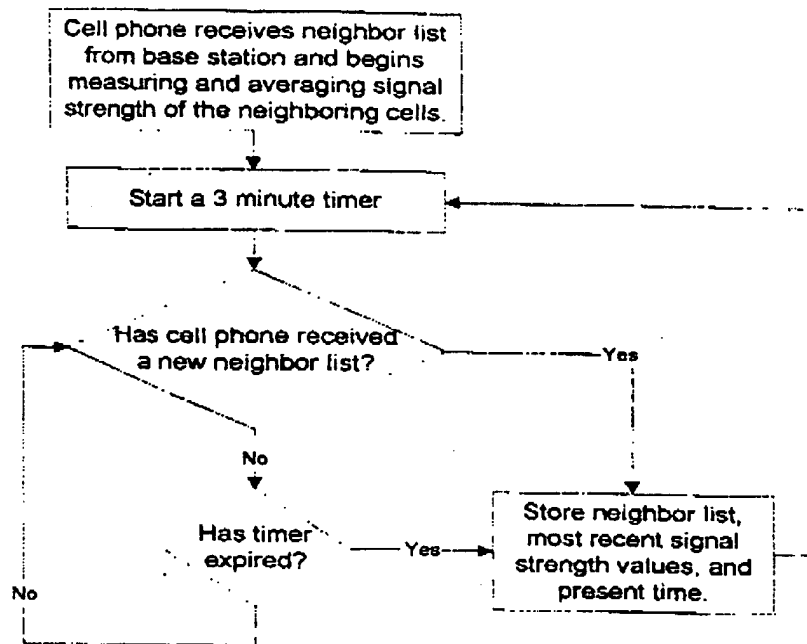
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Figure 2. Method of Storing Neighbor List History

Inventor(s) Signature(s)/Date(s):

Viktor G. Galt
Don Walsh

Witness Signatures/Dates:

Raf. Harte

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John E. Walsh

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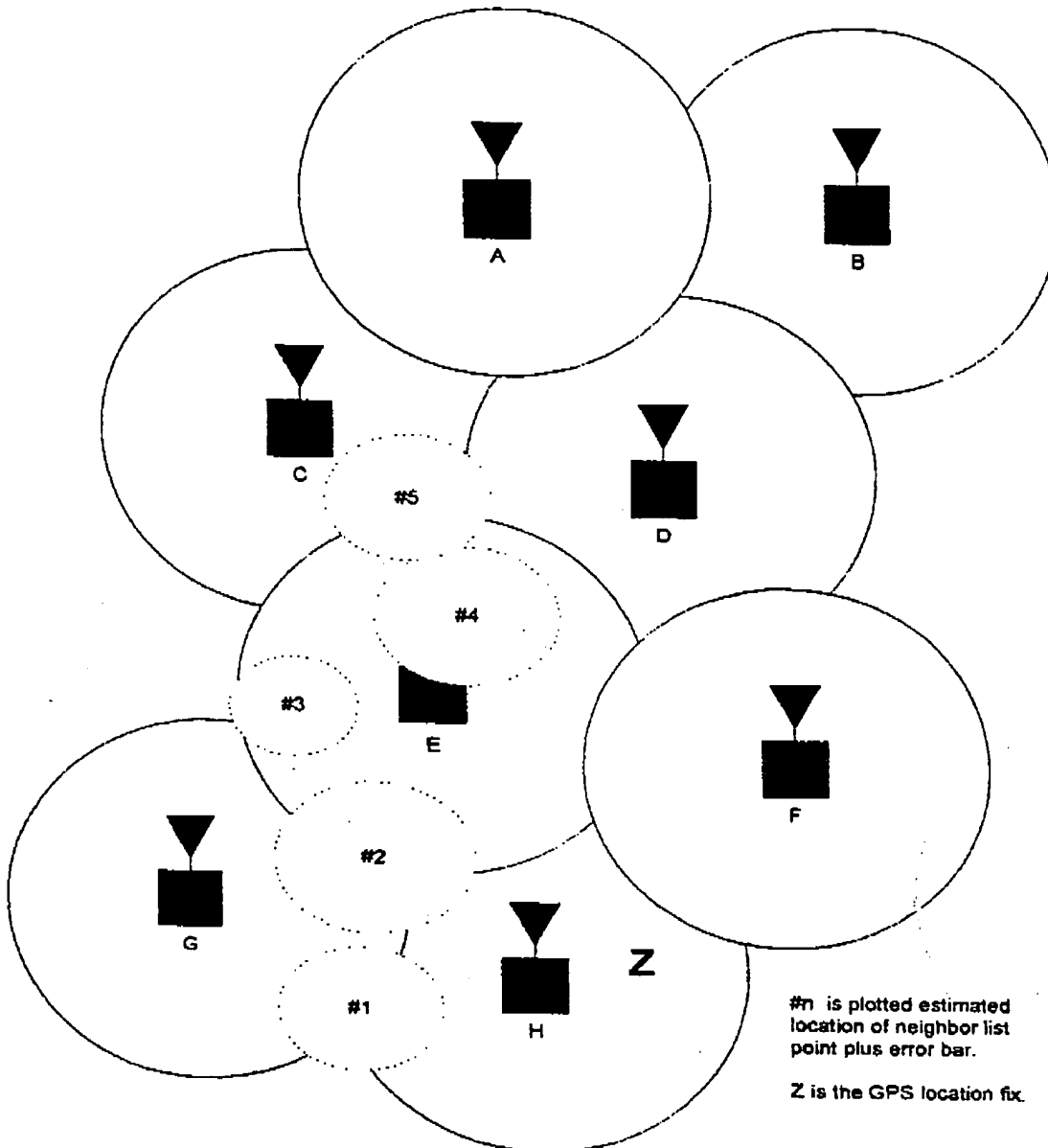
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Figure 3. Cell Site Map with History Points and GPS fix plotted

Inventor(s) Signature(s)/Date(s):

William P. Galt [Redacted]*David H. Hark* [Redacted]

Witness Signatures/Dates:

David H. Hark [Redacted]

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John E. White [Redacted]

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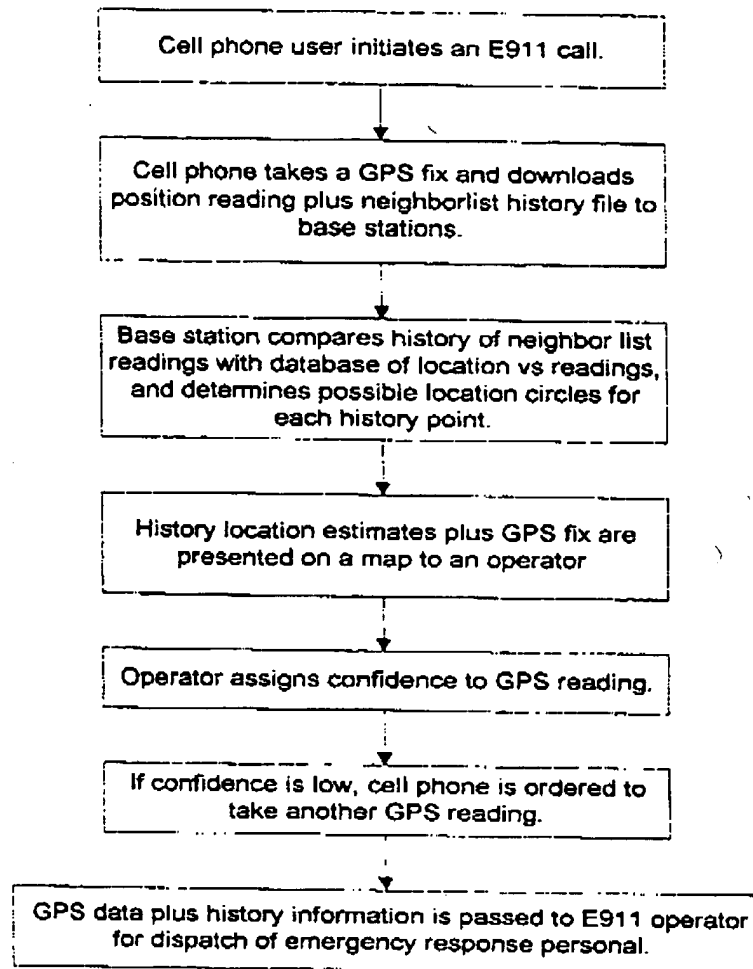
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Figure 4. Method of Processing History Points and GPS Fix

Inventor(s) Signature(s)/Date(s): William B. Albert [Redacted]

Witness Signatures/Dates: David Hart [Redacted]

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John E. Smith [Redacted]

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